

REMARKS/ARGUMENTS

This application has been amended in a manner that is believed to place it in condition for allowance at the time of the next Official Action. Claims 19-32 and 37-39 are pending in the present application. Claims 33-36 have been canceled without prejudice. Claims 19, 25-32 and 37-39 have been amended to more particularly point out and distinctly claim the present invention.

In the outstanding Official Action, claims 31, 32 and 34-36 were provisionally rejected under the judicially-created doctrine of obviousness-type double patenting as allegedly being unpatentable over claims 10-15 of co-pending application No. 09/913,603. This rejection is respectfully traversed.

Applicants believe that claims 31, 32, and 34-36 are patentably distinct from claims 10-15 of co-pending application 09/913,603. Nevertheless, in the interest of advancing prosecution, claim 31 has been amended to incorporate the recitations of claim 33. Claims 33-36 have been canceled without prejudice. Claims 32 remains dependent on claim 31. As the outstanding Official Action found previously pending claim 33 distinct from the claims of co-pending application No. 09/913,603, it is believed that this rejection has been obviated.

At this time, applicants would also like to point out that the exclusion of cellulose in claim 19 has been retracted,

and that claim 19 no longer recites a transition metal variant. Co-pending cases 09/913,596 and 09/913,603 are directed to a process involving a transition metal. In view of the above, it is believed that the amendment obviates the double patenting rejection. A copy of the claims for co-pending applications 09/913,596 and 09/913,603 are enclosed for the Examiner's convenience.

Claim 27 was objected to under 37 CFR 1.75(c) as allegedly being of improper dependent form for not further limiting the subject matter of a previous claim. Applicants believe that the present amendment obviates this rejection. Claim 27 has been amended to recite a process comprising oxidizing a carbohydrate to obtain a carbonyl-containing carbohydrate containing at least 1 cyclic monosaccharide chain group carrying a carbaldehyde group per 25 monosaccharide units and per molecule.

In the outstanding Official Action, claim 19 was rejected under 35 USC 101 for allegedly being directed to a "use" claim. The outstanding Official Action alleged that the claim set forth a "use" without setting forth any steps involved in a process. Applicants respectfully traverse this rejection.

While claim 19 recited "using" a nitroxyl compound, applicants note that the process was characterized in that a primary alcohol was oxidized. Nevertheless, in the interest of

advancing prosecution, applicants have amended claim 19 to recite a process for oxidizing a carbohydrate or a steroid containing primary alcohol groups, comprising reacting the carbohydrate with an oxidizing agent selected from oxygen, hydrogen peroxide, alkyl, aryl, and aralkyl hydroperoxides and chlorite, in the presence of a nitroxyl compound and in the presence of an enzyme capable of oxidation, in an aqueous medium, or in a mixture of water with an alcohol, an ether or a water-immiscible organic solvent. Thus, it is believed that claim 19 satisfies the requirements of 35 USC 101.

Claims 19-39 were rejected under 35 USC 112, first paragraph, for allegedly not complying with the written description requirement. These rejections are respectfully traversed.

As noted above, independent claim 19 is directed to a process for oxidizing a carbohydrate or a steroid containing a primary alcohol group, comprising reacting said carbohydrate with an oxidizing agent selected from oxygen, hydrogen peroxide, alkyl, aryl and aralkyl hydroperoxides and chlorite, in the presence of a nitroxyl compound and in the presence of an enzyme capable of oxidation in an aqueous medium, or in a mixture of water with an alcohol, an ether or a water-immiscible organic solvent.

Independent claim 31 is directed to an oxidized carbohydrate wherein the carbohydrate is selected from the group consisting of polysaccharides of alpha-glucan, mannan, galactan, fructan, and chitin types, and carbohydrate glycosides, containing 2 to 50 cyclic monosaccharide groups carrying a carbaldehyde group per 50 monosaccharide units and per molecule, or a carboxyalkyl derivative obtained by further oxidation or carboxylalkylation thereof.

Claim 39 is directed to an oxidized carbohydrate wherein the carbohydrate is selected from disaccharides, oligosaccharides, or polysaccharides of the beta-glucan type, containing at least 1 cyclic monosaccharide group carrying a carbaldehyde group per 25 monosaccharide units and per molecule, further containing carboxymethyl groups.

Applicants believe that the present specification satisfies the written description requirement. As the Examiner is aware, an objective standard for determining compliance with the written description requirement is, "does the description clearly allow persons of ordinary skill in the art to recognize that he or she invented what is claimed." *In re Gosteli*, 872 F.2d 1008, 1012, 10 USPQ 2d 1614, 1618 (Fed. Cir. 1989). Indeed, upon reviewing the specification, it is clear that the inventors envisioned that the invention encompasses fructans and cellulose (see present specification, page 2, line 24). Likewise, the

present specification also plainly recites the utilization of steroids as part of the invention (see present specification, page 4, lines 18-20). As a result, it is believed that the claimed invention satisfies the written description requirement.

Moreover, while the outstanding Official Action alleged that the current evidence of record is insufficient for satisfying the written description requirement, applicants note that the Examiner has the initial burden of presenting evidence or reasons as to why one skilled in the art would not recognize in applicants' disclosure a description of the invention defined by the claims. *In re Wertheim*, 541 F.2d 257, 191 USPQ 90 (CCPA 1976). Applicants believe that the Official Action fails to show that the claimed invention is not supported by a sufficient written description.

Indeed, while the outstanding Official Action comments on the number of examples set forth in the specification and notes that an adequate representation of species requires that the species which are expressly described are indeed recognized in the art as representative of the entire genus, the Official Action does not present any evidence that would suggest that one of ordinary skill in the art would not be in possession of carbohydrates and steroids in view of the present written description. As a result, applicants believe that the outstanding Official Action fails to meet its burden in showing that the

claimed invention is not supported by sufficient written description.

In the outstanding Official Action, claims 19-39 were rejected under 35 USC 112, second paragraph, as allegedly being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Upon reviewing amended claims 19-32 and 37-39, it is believed to be apparent that the claims have been amended in a manner that is definite to one of ordinary skill in the art. Indeed, the Examiner's attention is respectfully directed to claims 19, 25, 26, 28-30, 31, and 39. As noted above, claims 33-36 have been cancelled. Thus, it is believed that claims 19-32 and 37-39 are definite to one of ordinary skill in the art and applicants respectfully request that the rejection be withdrawn.

In the outstanding Official Action, claims 31 and 32 were rejected under 35 USC 102(b) as allegedly being anticipated by BeMILLER et al. It is believed that this rejection has been obviated by the present amendment.

As noted above, claim 31 has been amended to incorporate the recitation of claim 33. As a result, it is believed that BeMILLER et al. fail to anticipate the claimed invention.

In view of the present amendment and foregoing remarks, therefore, it is believed that this application is now in

condition for allowance, with claims 19-32 and 37-39, as presented. Such action is accordingly respectfully requested.

The Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 25-0120 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17.

Respectfully submitted,

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Appendix:

The claims of co-pending applications 09/913,596 and
09/913,603.



09/913,596

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Amendments To The Claims

This listing of claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims

1. (Previously presented) A process for oxidising cellulose comprising:
obtaining nitrosonium ions by oxidising a nitroxyl compound with an oxidising agent in the presence of a complex of a transition metal and a complexing agent, and oxidizing the cellulose with the nitrosonium ions.
2. (Currently amended) A process according to Claim 1, wherein the nitroxyl compound is a di-tert-nitroxyl di-tert-alkyl-nitroxyl compound.
3. (Previously presented) A process according to Claim 1, wherein the transition metal is manganese, iron, cobalt, nickel, copper or vanadium.
4. (Previously presented) A process according to Claim 1, wherein the complexing agent is a nitrogen-containing compound.
5. (Original) A process according to Claim 4, wherein the complexing agent is a bipyridyl or a triazonane or a (poly)histidine.
6. (Canceled)
7. (Currently amended) A process for oxidising cellulose comprising:
obtaining nitrosonium ions by oxidising a nitroxyl compound with an oxidising agent in the presence of an oxidative enzyme or a complex of a transition metal and a complexing agent, and
oxidizing the cellulose with the nitrosonium ions,
wherein a cellulose derivative containing at least 1 cyclic monosaccharide chain group carrying a carbaldehyde group per 25 monosaccharide units and per average cellulose molecule is produced.
8. (Currently amended) An oxidised cellulose derivative, containing at least 1 cyclic monosaccharide chain group carrying a 6-carbaldehyde group and at least 1 cyclic monosaccharide chain group carrying a 6-carboxylic group per 100 monosaccharide units and per average cellulose molecule, and further containing

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carboxyl groups obtained by further oxidation or carboxyalkylation of hydroxyl groups of the cellulose.

9. (Currently amended) A cellulose derivative, in which derivative at least a part of the 6-carbaldehyde groups introduced by oxidation has been converted to a group with the formula $-\text{CH}=\text{N}-\text{R}$ or $-\text{CH}_2\text{NHR}$, wherein R is hydrogen, hydroxyl, amino, or a group R^1 , OR^1 or NHR^1 , in which R^1 is $\text{C}_1\text{-C}_{20}$ alkyl, $\text{C}_1\text{-C}_{20}$ acyl, a carbohydrate residue, or ~~a group coupled with or capable of coupling with a carbohydrate residue~~ $\text{C}_1\text{-C}_{20}$ alkyl substituted by amino or hydroxyl.

10. (Currently amended) A cellulose derivative, in which derivative at least a part of the 6-carbaldehyde groups introduced by oxidation has been converted to a group with the formula $-\text{CH}(\text{OR}^3)-\text{O}-\text{CH}_2-\text{COOR}^2$ or $-\text{CH}(\text{O}-\text{CH}_2-\text{COOR}^2)_2$, in which R^2 is hydrogen, a metal cation or an optionally substituted ammonium group, and R^3 is hydrogen or a direct bond ~~to the oxygen atom of a dehydrogenated~~ replacing a hydroxyl group of the cellulose.

11. (Previously presented) A process according to Claim 1, wherein the nitroxyl compound is 2,2,6,6-tetra-methylpiperidin-1-oxyl (TEMPO).

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AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

LISTING OF CLAIMS

Claim 1. (Currently amended) A process for producing nitrosonium ions comprising by oxidising a nitroxyl compound by subjecting the nitroxyl compound to the action of with an oxidising agent, ~~characterised in that the nitroxyl compound is oxidised in the presence of a complex of a transition metal and a complexing agent.~~

Claim 2. (Currently amended) A process according to Claim 1, wherein [[a]] the nitroxyl compound is a di-tert-nitroxyl compound[[.]] especially 2,2,6,6-tetramethylpiperidin-1-oxyl (TEMPO).

Claim 3. (Previously presented) A process according to Claim 1, wherein the transition metal is manganese, iron, cobalt, nickel, copper or vanadium.

Claim 4. (Previously presented) A process according to Claim 1, wherein the complexing agent is a nitrogen-containing compound.

Claim 5. (Original) A process according to Claim 4, wherein the complexing agent is a bipyridyl or a triazonane or a (poly)histidine.

Claim 6. (Currently amended) A process for oxidising a carbohydrate comprising producing nitrosonium ions by oxidising a nitroxyl compound with an oxidising agent in the presence of a complex of a transition metal and a complexing agent, and subjecting the carbohydrate to the action of with an oxidising agent in the presence of a said nitrosonium ion ions as a catalyst[[.]] ~~characterised in that the nitrosonium ion is produced by the process according to Claim 1.~~

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Claim 7. (Currently amended) A process according to Claim 6, wherein the carbohydrate is an α -glucan or fructan or a carboxymethylated, alkylated, or hydroxyalkylated derivative thereof.

Claim 8. (Currently amended) A process according to Claim ~~[[1]]~~ 6, wherein a carbonyl-containing carbohydrate containing at least 1 cyclic monosaccharide chain group carrying a carbaldehyde group per 25 monosaccharide units and per average molecule is produced.

Claim 9. (Currently amended) A process according to Claim ~~[[1]]~~ 6, wherein the carbohydrate is hydroxyalkylated carbohydrate or a glycoside.

Claim 10. (Currently amended) An oxidized carbohydrate, the carbohydrate being selected from disaccharides, oligosaccharides and polysaccharides of the α -glucan, mannan, galactan, fructan, and chitin types and carbohydrate glycosides, containing at least 1 cyclic monosaccharide chain group carrying a carbaldehyde group per 25 monosaccharide units and per average molecule or a chemical carboxymethylated, alkylated or hydroxyalkylated derivative thereof and further containing carboxyl and/or carboxymethyl groups.

Claim 11. (Currently amended) An oxidised carbohydrate according to Claim 10, containing at least 5 monosaccharide units per average molecule.

Claim 12. (Currently amended) An oxidized carbohydrate, the carbohydrate being selected from disaccharides, oligosaccharides and polysaccharides of the α -glucan, mannan, galactan, fructan, and chitin types and carbohydrate glycosides, containing at least 1 cyclic monosaccharide group carrying a carbaldehyde group per 25 monosaccharide units and per molecule or a derivative thereof A carbohydrate derivative according to Claim 10, in which derivative at least a part portion of the carbaldehyde groups has been converted to a group with the formula $-\text{CH}=\text{N}-\text{R}$ or $-\text{CH}_2-\text{NHR}$, wherein R is hydrogen, hydroxyl, amino, or a group R^1 , OR^1 or NHR^1 , in which R^1 is C_1 - C_{20} alkyl, C_1 - C_{20} acyl, a carbohydrate residue, or group coupled with or capable of coupling with a carbohydrate residue.

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Claim 13. (Currently amended) An oxidized carbohydrate, the carbohydrate being selected from disaccharides, oligosaccharides and polysaccharides of the α -glucan, mannan, galactan, fructan, and chitin types and carbohydrate glycosides, containing at least 1 cyclic monosaccharide group carrying a carbaldehyde group per 25 monosaccharide units and per molecule or a derivative thereof A carbohydrate derivative according to Claim 10, in which derivative at least a part portion of the carbaldehyde groups has been converted to a group with the formula $-\text{CH}(\text{OR}^3)-\text{O}-\text{CH}_2-\text{COOR}^2$ or $-\text{CH}(\text{O}-\text{CH}_2-\text{COOR}^2)_2$, in which R^2 is hydrogen, a metal cation or an optionally substituted ammonium group, and R^3 is hydrogen or a direct bond to the oxygen atom of a dehydrogenated hydroxyl group of the carbohydrate.

Claim 14. (Previously presented) A carbohydrate according to Claim 12, further containing carboxyl and/or carboxymethyl groups.

Claim 15. (Previously presented) A carbohydrate according to Claim 13, further containing carboxyl and/or carboxymethyl groups.